Purpose:

The purpose of integration testing is to test all functional groups and areas. The emphasis is on verifying the interfaces between functions, and user and functional workflows. Critical external interfaces should also be tested. See also **external interface testing**.

Some contracts do not permit State visibility into integration testing (such as when some of the software is COTS). The text below assumes the State does have visibility into this testing phase. **Note**: COTS products should be integration tested to ensure the products work correctly on the proposed hardware and environment.

Assumptions/Pre-Conditions:

The contractor/developer should have completed unit and functional testing successfully and all critical errors should have been addressed. An updated version of the code should have been delivered to the Configuration Manager.

Expectations:

- The primary emphasis is verification of each functional area and inter-function interfaces.
- All testable requirements (ideally) should have been tested at least once by the end of integration testing. This level of testing provides a greater level of confidence when entering System Test. At a minimum, all critical requirements should have been verified at or by this point.
- Hardware specifications and COTS software components/major functions/subsystems should be verified for correctness and compliance with specifications (e.g., mail opening equipment, scanning software packages, etc.).
- Critical **external interfaces** should be verified. This may require coordination with other departments, agencies or companies.
- Some performance tests may be conducted and used to model or extrapolate behavior.
- All affected documentation should be updated to reflect fixes and changes, including in-line code comments and unit/module/function headers, design documents, user manuals, training materials, help desk procedures or bulletins, and help files. This may be delayed until System Test, depending on change stability and resources.

Responsibilities:

- Creation of Tests - Developer or Tester
- Execution of Tests - Developer or Tester
- Approval of Test Results/Exit Decision (depending on level of State visibility) - Development Manager, Test Manager, QA Manager, Configuration Manager, State Project Manager
- For a complete list of roles and responsibilities, refer to the **Responsibility Assignment Matrix (RAM)** (MS Word)

Environment:

Development or Test Environment

Type of Data:

Real data (data which was processed on the legacy system and is now being re-used for testing), if

possible; else simulated data created to model real data.

Exit Decisions:

- Refer to the **general test exit/acceptance criteria**.

References:

- IEEE Standard **829-1998**, Standard for Software Test Documentation (link to pdf)
- IEEE Standard **1012-1998**, Standard for Software Verification and Validation, Table 1, Section 5.4.5 within table (the tables appear prior to the annex) (link to pdf)
- Archived IEEE Standard **1059-1993**, Guide for Software Verification and Validation Plans, Sections 4.2.4 and 5.5.6 (link to pdf)

Samples:

- **CWS/CMS Integration Test Exit Report** (MS Word)

System Development Contractor Oversight

Responsibility Assignment Matrix

Milestone #5 – Integration Test Completed/Approved

Column 1 lists the expectations for the phase. The remaining columns indicate the expected reviewers (for the Deliverables and Interim Work Products section), or the participants (for the Activities/Decisions and Reviews/Meetings section).

Legend:

P – Primary Responsibility

S – Support Discussions/Activity, as needed

R – Reviewer

A - Approver

I – For Information Only

Note: This matrix assumes that the Prime Contractor has primary responsibility for Integration Testing, and that the project office has some visibility into the process. For M&O projects, the Prime Contractor can be interpreted to be either project or contractor testing staff.

MILESTONE EXPECTATIONS	PROJECT OFFICE MGMT	PROJECT OFFICE CONTRACT MANAGER	PROJECT OFFICE SYSTEMS ENGRING	PROJECT OFFICE QUALITY ASSURANCE	PROJECT OFFICE IMPLMNTN TEAM	PROJECT OFFICE BUSINESS/ INDUSTRY CONSULTANTS	PROJECT OFFICE LEGAL SUPPORT	STAKEHOLDERS/ USER REPS	INDEPENDENT VERIFICATION AND VALIDATION	PRIME CONTRACTOR
Deliverables[1]										
Module/Functional Test Materials (procedures, scripts, cases, data, etc)	A		S or R	R	R	S or R			R	P or S
Module/Functional Test Report	A		S or R	R	R	S or R		I	R	P or S

[1] Final versions of deliverables required for exit of this phase.

System Development Contractor Oversight

Responsibility Assignment Matrix

Milestone #5 – Integration Test Completed/Approved

MILESTONE EXPECTATIONS	PROJECT OFFICE MGMT	PROJECT OFFICE CONTRACT MANAGER	PROJECT OFFICE SYSTEMS ENGRING	PROJECT OFFICE QUALITY ASSURANCE	PROJECT OFFICE IMPLMNTN TEAM	PROJECT OFFICE BUSINESS/ INDUSTRY CONSULTANTS	PROJECT OFFICE LEGAL SUPPORT	STAKEHOLDERS/ USER REPS	INDEPENDENT VERIFICATION AND VALIDATION	PRIME CONTRACTOR
Integration Test Materials (procedures, scripts, cases, data, etc.)	A		S or R	R	R	S or R			R	P or S
Integration Test Report	A		S or R	R	R	S or R		I	R	P or S
Training Curriculum	A		R	R	R	R/S			R	P
System Test Plan and Scenarios	A		R/S	R	R	R/S			R	P
Updated Workplan	A		R	R	R	R			R	P
Updated Data Conversion Workplan	A		R	R	R	R			R	P
Updated Implementation Workplan	A		R	R	R	R			R	P
Updated Capacity/ Performance Model	A	I	R	R	R	R			R	P
Interim Work Products[2]										

[2] Deliverables which may be in draft form at exit of this phase or which will be expanded in a future phase based on further information (e.g.: preliminary plan vs. final plan).

System Development Contractor Oversight

Responsibility Assignment Matrix

Milestone #5 – Integration Test Completed/Approved

MILESTONE EXPECTATIONS	PROJECT OFFICE MGMT	PROJECT OFFICE CONTRACT MANAGER	PROJECT OFFICE SYSTEMS ENGRING	PROJECT OFFICE QUALITY ASSURANCE	PROJECT OFFICE IMPLMNTN TEAM	PROJECT OFFICE BUSINESS/ INDUSTRY CONSULTANTS	PROJECT OFFICE LEGAL SUPPORT	STAKEHOLDERS/ USER REPS	INDEPENDENT VERIFICATION AND VALIDATION	PRIME CONTRACTOR
Training Materials, including business processes	A		R	R	R	R			R	P
System Release Notes	A		R	R	R	R			R	P
Updated Code/Unit Test Materials (if applicable)	A		R	R	R	R			R	P
Updated Design Documentation (if applicable)	A		R	R	R	R			R	P
Updated System Test Plan (if applicable)	A		P, S or R	R	R	S or R			R	S or P
Activities/Decisions										
Verify assumptions for the phase are still valid.	A	I	S	S	S	S	S	S	R	P
Validate the Capacity/ Performance Model assumptions and calculations.	A		R	R	I	R		I	R	P

System Development Contractor Oversight

Responsibility Assignment Matrix

Milestone #5 – Integration Test Completed/Approved

MILESTONE EXPECTATIONS	PROJECT OFFICE MGMT	PROJECT OFFICE CONTRACT MANAGER	PROJECT OFFICE SYSTEMS ENGRING	PROJECT OFFICE QUALITY ASSURANCE	PROJECT OFFICE IMPLMNTN TEAM	PROJECT OFFICE BUSINESS/ INDUSTRY CONSULTANTS	PROJECT OFFICE LEGAL SUPPORT	STAKEHOLDERS/ USER REPS	INDEPENDENT VERIFICATION AND VALIDATION	PRIME CONTRACTOR
Re-validate Deliverable Expectation Documents prior to vendor beginning work on each deliverable.	A	P	P	R	R	R		R	R	R
Verify traceability of the requirements to the tests and requirements tool.	A		R	R					R	P
Upon approval of the requirements, baseline the requirements/ requirements tool contents.	A			I					R	P
Reviews/Audits										
Deliverable Review Meetings (see participants for each deliverable listed above)	P						S		R	P
Integration Test Mtgs			S	S	I	S		S	I	P

System Development Contractor Oversight

Responsibility Assignment Matrix

Milestone #5 – Integration Test Completed/Approved

Milestone Expectations	Project Office Mgmt	Project Office Contract Manager	Project Office Systems Engring	Project Office Quality Assurance	Project Office Implmntn Team	Project Office Business/ Industry Consultants	Project Office Legal Support	Stakeholders/ User Reps	Independent Verification and Validation	Prime Contractor
System Test Readiness Review Mtg (mini-milestone)	A	I	S	S	I	S	S	S	R	P
QA/CM Audit	A	I	S	S	I				R	P
Phase Closeout Meeting	A	S	S	S	S	S	S	I	R	P